

**IN THE DRAWINGS**

Please amend FIG. 4 as shown in the attached annotated sheet showing changes in red. The Applicant submits herewith a replacement sheet includes the changes to FIG. 4.

## REMARKS

In the Office Action, the Examiner noted that claims 1-51 are pending in the application, and that claims 1-51 are rejected. By this response, claims 1, 14-17, 34, 39, 41, 44, and 46 are amended and claims 2-13, 18-33, 35, 37-38, 40, 42-43, 45, and 47-51 are cancelled. Claims 52-55 have been newly added. In view of the above amendments and the following discussion, the Applicant submits that none of the claims now pending in the application are non-compliant under the provisions of 35 U.S.C. §112, anticipated under the provisions of 35 U.S.C. §102, or obvious under the provisions of 35 U.S.C. §103. Thus, the Applicant believes that all of these claims are now in condition for allowance.

### I. OBJECTIONS

#### **A. Drawings**

The Examiner objected to the drawings under 37 C.F.R. §1.83(a) as not showing every feature of the invention specified in the claims. In particular, the Examiner stated that the feature “switching device” recited in claim 34 is not shown in the drawings. The Applicant has amended claim 34 and the feature “switching device” has been deleted. Accordingly, the Applicant respectfully requests that the present objection to the drawings be withdrawn.

The Examiner objected to the drawings under 37 C.F.R. §1.84(p)(5) as including reference signs not mentioned in the description. In particular, the Examiner stated that the reference signs 401, 402, 404, and 406 shown in FIG. 4 are not mentioned in the description. The Applicant has amended the specification to reference the correct reference signs with respect to the description of FIG. 4. Notably, the reference signs 401, 402, 404, and 406 are now mentioned in the description. In addition, FIG. 4 has been amended to correct a typographical error in reference signs. Accordingly, the Applicant respectfully requests that the present objection to the drawings be withdrawn.

**B. Claims**

The Examiner objected to claim 42 under 37 C.F.R. §1.75(c) as being of improper dependent form for failing to further limit the subject matter of the previous claim. The Applicant has canceled claim 42 and thus the present objection is moot.

**II. REJECTION OF CLAIMS UNDER 35 U.S.C. §112****A. Claims 19-20 and 29**

The Examiner rejected claims 19-20 and 29 as failing to comply with the written description requirement of 35 U.S.C. §112, first paragraph. In particular, the Examiner stated that the feature “combiner” is not disclosed anywhere in the specification. The Applicant has canceled claims 19-20 and 29 and thus the present rejection is moot.

**B. Claim 34**

The Examiner rejected claim 34 as failing to comply with the written description requirement of 35 U.S.C. §112, first paragraph. In particular, the Examiner stated that the feature “switching device” is not disclosed anywhere in the specification. The Applicant has amended claim 34 the feature “switching device” has been deleted. The Applicant contends that claim 34, as amended, fully satisfies the requirements under 35 U.S.C. §112, first paragraph.

**C. Claims 40, 48, and 50-51**

The Examiner rejected claims 40, 48, and 50-51 as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicant regards as the invention under 35 U.S.C. §112, second paragraph. Claims 40, 48, and 50-51 have been cancelled and thus the present rejection is moot.

**III. REJECTION OF CLAIMS UNDER 35 U.S.C. §102(e)**

The Examiner rejected claims 1-6, 8-12, 14-15, 18-22, 25, 29-33, and 41-42 as being anticipated by Lindholm (United States patent. 6,477,207, issued November 5, 2002). In particular, the Examiner stated that Lindholm discloses each of the features

recited in Applicant's claims 1 and 14. (Office Action, pp. 5 and 7). The rejection is respectfully traversed.

Lindholm generally teaches a VDSL connection. (See Lindholm, col. 3, lines 38-65; FIG. 1). In particular, Lindholm teaches dividing a VDSL bitstream onto several carriers within the VDSL frequency band such that the carriers are placed on bands limited by the worst expected interference bands. Lindholm uses several parallel modulators to modulate the bitstream on the difference carriers. (Lindholm, col. 4, lines 11-21; FIG. 4).

Lindholm, however, does not teach each and every element of Applicant's invention recited in amended claim 1. Notably, Lindholm does not teach or suggest transmitting a downstream signal over two twisted wire pairs to a location using only a lower frequency range of a DSL frequency plan. Specifically, Applicant's claim 1 positively recites:

A method for providing digital subscriber line (DSL) service having a DSL frequency plan with an upper frequency range and a lower frequency range to a location an extended distance from an access network, the method comprising:  
generating a downstream signal;  
providing the downstream signal to a first transmitter and a second transmitter;  
transmitting the downstream signal from the first transmitter to the location over a first twisted wire pair using only the lower frequency range of the DSL frequency plan; and  
transmitting the downstream signal from the second transmitter to the location over a second twisted wire pair using only the lower frequency range of the DSL frequency plan.

(Emphasis added). By utilizing only the lower frequency range in the spectrum, and by utilizing two twisted wire pairs, the invention recited in claim 1 advantageously extends the reach of the DSL service. (See Applicant's specification, ¶126).

Lindholm does not teach or suggest transmitting a downstream signal over two twisted wire pairs to single location. Rather, Lindholm teaches transmission of a bitstream over multiple carriers on a single pair. In addition, Lindholm does not teach or suggest transmitting a downstream signal over a twisted wire pair using only the lower frequency range of a DSL frequency plan having an upper frequency range and a lower frequency range. Rather, Lindholm teaches the use of multiple carriers disposed throughout the full bandwidth of the VDSL connection. (See Lindholm, col. 6, lines 1-4).

“Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim.” Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co., 221 USPQ 481, 485 (Fed. Cir. 1984) (emphasis added). Since Lindholm does not teach transmitting a downstream signal over two twisted wire pairs to a location using only a lower frequency range of a DSL frequency plan, Lindholm does not teach each and every element of Applicant’s invention recited in claim 1. Therefore, the Applicant contends that the invention recited in claim 1 is not anticipated by Lindholm and, as such, fully satisfies the requirements of 35 U.S.C. §102.

Amended independent claim 14 recites an apparatus having features similar to those emphasized above in claim 1. For the same reasons discussed above, the Applicant contends that the invention recited in independent claim 14 is also not anticipated by Lindholm and fully satisfies the requirements of 35 U.S.C. §102. Claims 2-6, 8-12, 18-22, 25, 29-33, and 42 have been cancelled and thus the rejection of such claims is moot. Claims 15 and 41 depend, either directly or indirectly, from claims 1 and 14 and recite additional features therefor. Since Lindholm does not anticipate Applicant’s invention as recited in claims 1 and 14, dependent claims 15 and 41 are also not anticipated and are allowable.

#### **IV. REJECTION OF CLAIMS UNDER 35 U.S.C. §103**

##### **A. Claims 7, 13, and 26-28**

The Examiner rejected claims 7, 13, and 26-28 as being unpatentable over Lindholm in view of Lewin (United States patent 6,680,940, issued January 20, 2004). The rejection is respectfully traversed.

More specifically, the Examiner conceded that Lindholm does not disclose the use of two separate twisted wire pairs in parallel to transmit a data stream. (Office Action, p. 9). The Examiner stated, however, that Lewin teaches splitting a serial Ethernet signal among multiple VDSL transceivers. (Office Action, p. 9). The Examiner concluded that it would have been obvious to modify the VDSL connection of Lindholm

to send VDSL signals over multiple twisted wire pairs. (Office Action, p. 9). The Applicant respectfully disagrees.

Lewin generally teaches encapsulation of Ethernet frames over VDSL. (See Lewin, Abstract). In particular, Lewin teaches a DSL access multiplexer (DSLAM) adapted to generate a plurality of VDSL streams to be transmitted over a plurality of VDSL facilities using one or more VDSL transceivers. (Lewin, col. 8, lines 47-60).

Claims 7, 13, and 26-28 have been cancelled. The feature of parallel transmission of the downstream signal over two twisted wire pairs has been added to independent claims 1 and 14, from which claims 7, 13, and 26-28 previously depended. The cited references, either singly or in any permissible combination, do not teach, suggest, or otherwise render obvious Applicant's invention recited in claims 1 and 14. Namely, the combination of Lindholm and Lewin does not teach or suggest transmitting a downstream signal over two twisted wire pairs to a location using only a lower frequency range of a DSL frequency plan.

As discussed above in Section III, Lindholm is devoid of any teaching or suggestion of transmission of a downstream signal over two twisted wire pairs to single location. In addition, both Lindholm and Lewin fail to teach or suggest transmission of a downstream signal over a twisted wire pair using only the lower frequency range of a DSL frequency plan having an upper frequency range and a lower frequency range. Since neither Lindholm nor Lewin teach or suggest transmitting a downstream signal over two twisted wire pairs to a location using only a lower frequency range of a DSL frequency plan, no conceivable combination of Lindholm and Lewin renders obvious Applicant's invention recited in claims 1 and 14. Therefore, the Applicant contends that claims 1 and 14 are patentable over the cited references and, as such, fully satisfy the requirements of 35 U.S.C. §103.

#### **B. Claims 16-17, 23-24, and 46-47**

The Examiner rejected claims 16-17, 23-24, and 46-47 as being unpatentable over Lindholm in view of Bahlenberg (PCT application WO 99/23764, published May 14, 1999). The rejection is respectfully traversed.

Bahlenberg generally teaches extending the reach of a VDSL system by combining the advantages of orthogonal frequency divided duplex (OFDD) with frequency divided duplex (FDD). (See Bahlenberg, Abstract). In particular, Bahlenberg teaches the use of FDD for lower frequencies and OFDD for higher frequencies. (Bahlenberg, p. 6, lines 6-16).

Claims 16-17, 23-24, and 47 have been cancelled. Claim 46 depends from claim 34 and recites additional features therefor. The cited references, either singly or in any permissible combination, do not teach, suggest, or otherwise render obvious Applicant's invention recited in claim 34. Namely, the combination of Lindholm and Bahlenberg fails to teach or suggest transmitting a signal over two transmission lines using only a lower frequency range of a DSL frequency plan, and receiving a signal from two transmission lines using only a lower frequency range of a DSL frequency plan.

Specifically, claim 34 positively recites:

A transceiver for providing digital subscriber line (DSL) service having a DSL frequency plan with an upper frequency range and a lower frequency range, comprising:

- a first transmission line;
- a second transmission line;
- a first transmitter for transmitting a first signal over the first transmission line using only the lower frequency range of the DSL frequency plan;
- a second transmitter for transmitting the first signal over the second transmission line using only the lower frequency range of the DSL frequency plan;
- a first receiver for receiving a second signal over the first transmission line using only the lower frequency range of the DSL frequency plan; and
- a second receiver for receiving the second signal over the second transmission line using only the lower frequency range of the DSL frequency plan.

(Emphasis added).

Rather, Lindholm teaches the use of multiple carriers disposed throughout the full bandwidth of the VDSL connection. (See Lindholm, col. 6, lines 1-4). Bahlenberg teaches the use of an OFDD modulation for the higher frequencies of the VDSL spectrum. Since neither Lindholm nor Bahlenberg teach or suggest transmitting a signal over two transmission lines using only a lower frequency range of a DSL frequency plan, or receiving a signal from two transmission lines using only a lower frequency range of a DSL frequency plan, no conceivable combination of Lindholm and

Bahlenberg renders obvious Applicant's invention recited in claim 34. Therefore, the Applicant contends that claim 46, which depends from claim 34, is patentable over the cited references and, as such, fully satisfies the requirements of 35 U.S.C. §103.

### **C. Claims 34 and 37**

The Examiner rejected claims 34 and 37 as being unpatentable over Lindholm in view of Lewin. The rejection is respectfully traversed.

More specifically, the Examiner conceded that Lindholm does not disclose the use of two separate twisted wire pairs in parallel to transmit a data stream. (Office Action, p. 11). The Examiner stated, however, that Lewin teaches splitting a serial Ethernet signal among multiple VDSL transceivers. (Office Action, p. 11). The Examiner concluded that it would have been obvious to modify the VDSL connection of Lindholm to send VDSL signals over multiple twisted wire pairs. (Office Action, p. 11). The Applicant respectfully disagrees.

The cited references, either singly or in any permissible combination, do not teach, suggest, or otherwise render obvious Applicant's invention recited in claim 34. Namely, the combination of Lindholm and Lewin fails to teach or suggest transmitting a signal over two transmission lines using only a lower frequency range of a DSL frequency plan, and receiving a signal from two transmission lines using only a lower frequency range of a DSL frequency plan. Both Lindholm and Lewin fail to teach or suggest transmission or reception of a signal over a transmission line using only the lower frequency range of a DSL frequency plan having an upper frequency range and a lower frequency range. Since neither Lindholm nor Lewin teach or suggest transmitting or receiving a signal over two transmission lines using only a lower frequency range of a DSL frequency plan, no conceivable combination of Lindholm and Lewin renders obvious Applicant's invention recited in claim 34. Therefore, the Applicant contends that claim 34 is patentable over the cited references and, as such, fully satisfy the requirements of 35 U.S.C. §103. Claim 37 has been cancelled and thus the rejection of claim 37 is moot.

### **D. Claim 35**



The Examiner rejected claim 35 as being unpatentable over Lindholm in view of Lewin in further view of Bahlenberg. Claim 35 has been cancelled and thus the rejection of claim 35 is moot.

#### **E. Claims 36-39**

The Examiner rejected claims 36-39 as being unpatentable over Lindholm. The rejection is respectfully traversed.

Claims 37-38 have been cancelled. Claims 36 and 39 depend from claim 34 and recite additional features therefore. As discussed above, Lindholm does not teach, suggest, or otherwise render obvious Applicant's invention as recited in claim 34. Namely, Lindholm does not teach or suggest transmitting a signal over two transmission lines using only a lower frequency range of a DSL frequency plan, and receiving a signal from two transmission lines using only a lower frequency range of a DSL frequency plan. Rather, Lindholm teaches the use of multiple carriers disposed throughout the full bandwidth of the VDSL connection. (See Lindholm, col. 6, lines 1-4). Therefore, the Applicant contends that claims 36 and 39, which depend from claim 34, are patentable over Lindholm and fully satisfy the requirements of 35 U.S.C. §103.

#### **F. Claims 43 and 44**

The Examiner rejected claims 43 and 44 as being unpatentable over Lindholm in view of Kaplan (United States published patent application 2002/0087976, published July 4, 2002). The rejection is respectfully traversed.

Claim 43 has been cancelled. Claim 44 depends from claim 34 and recites additional features therefore. The cited references, either singly or in any permissible combination, fail to teach, suggest, or otherwise render obvious Applicant's invention recited in claim 34. Namely, the combination of Lindholm and Kaplan fails to teach or suggest transmitting a signal over two transmission lines using only a lower frequency range of a DSL frequency plan, and receiving a signal from two transmission lines using only a lower frequency range of a DSL frequency plan. Rather, Kaplan Lindholm teaches the use of multiple carriers disposed throughout the full bandwidth of the VDSL connection. (See Lindholm, col. 6, lines 1-4). Kaplan generally teaches that a DSLAM

is a network device for multiplexing DSL connections. Kaplan is devoid of any teach or suggestion of transmitting or receiving a signal over two transmission lines using only a lower frequency range of a DSL frequency plan. Since neither Lindholm nor Kaplan teach or suggest transmitting a signal over two transmission lines using only a lower frequency range of a DSL frequency plan, and receiving a signal from two transmission lines using only a lower frequency range of a DSL frequency plan, no conceivable combination of Lindholm and Kaplan renders obvious Applicant's invention recited in claim 34. Therefore, the Applicant contends that claim 44, which depends from claim 34, is patentable over the cited references and, as such, fully satisfies the requirements of 35 U.S.C. §103.

#### **G. Claims 49-51**

The Examiner rejected claims 49-51 as being unpatentable over Lindholm in view of Bahlenberg. Claims 49-51 have been cancelled and thus the present rejection is moot.

#### **V. REJECTION OF CLAIMS FOR DOUBLE PATENTING**

The Examiner noted that should claim 44 be found allowable, claim 45 will be objected to as being a substantial duplicate thereof. Claim 45 has been cancelled. Accordingly, the Applicant respectfully requests that the double patenting rejection be withdrawn.

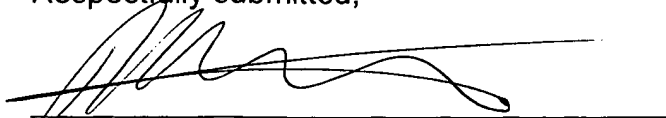
#### **CONCLUSION**

Thus, Applicants submit that none of the claims presently in the application are non-compliant under the provisions of 35 U.S.C. §112, anticipated under the provisions of 35 U.S.C. §102, or obvious under the provisions of 35 U.S.C. §103. Consequently, Applicants believe that all these claims are presently in condition for allowance. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

If, however, the Examiner believes that there are any unresolved issues requiring any adverse final action in any of the claims now pending in the application, it is

requested that the Examiner telephone Mr. Robert M. Brush, Esq. or Mr. Kin-Wah Tong, Esq. at (732) 530-9404 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'R. Brush', is written over a horizontal line.

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